Not only do we desire to see fountains send forth their cool and limpid streams uninterruptedly; but, also, at short intervals throughout the entire length of our streets and alleys, we should wish to see erected and connected with the mains, instead of the present fire-plugs,—stand-cocks, which might be cast with an ornamental appearance. These stand-cocks, or a certain proportion of them, should be supplied with flexible hoses, the extremities of which should be capable of being fitted with delivery-nozzles and spreaders, according as it might be required to direct streams of water upon a burning building, or to water or wash the streets. If these arrangements were adopted, and every policeman on duty provided with a key to the stand-cocks, as is the case at Liverpool, the risk of destruction of property by fire would be greatly diminished, and the rates of insurance ought to decrease proportionately. But, supposing the insurance companies refused to reduce their rates, as it has been publicly stated they would, nothing could be easier than for the inhabitants to establish an office for that purpose on the mutual principle. A large shipowner, we have heard, finds it more profitable to risk the loss of one vessel annually than to insure his whole fleet of merchantmen. The saving in insurance rates is not the only economy the carrying out of this system would effect. The watering and cleansing of streets constitute a heavy tax upon the parishes at present, but with high service and stand-cocks fitted with flexible hoses, as before explained, no horses and carts need be employed, while even fewer hands would be required for watering as often as might be deemed necessary. Indeed, we see no reason why the police should not be employed in this duty. The cleansing the paved streets would also be rendered less laborious and less costly than at present, by washing them down every morning instead of sweeping up the dirt and carting it away.

Some useful information upon these three heads—the economy in insurance rates, watering, and cleansing streets—might be obtained from Boston, in the United States of North America, and we certainly think that the promoters of the Bill would do well to provide themselves with accurate data obtained from this source before they proceed further in the matter.

ON THE FORM AND POWER OF CHAIN CABLE LINKS FOR CRANES, &c.

THE form inevitably assumed by the oval-shaped link in common use when overstrained, might, one would think, have not only suggested the idea of adopting that form, *ab initio*, with unstrained fibres, adapted, *à priori*, in cementive integrity, to the pull *à posteriori* which was certain otherwise to tend at least, in every instance, to force it into the assumption of that well-set pulling shape, the flat sided; but have also, long ere now, made oval links, even cross studded and strengthened (?) ones, quite obsolete. All the more so, since our bridge-building engineers have almost of necessity been led to adopt flat-sided links, albeit pretty long ones, and even our Admiralty a sort of medium between these and the right sort. Considerations such as these, we believe, led to the introduction of Price's improved method, which simply consists in the substitution of the short straight-sided link for the oval. This link is constructed in such a way that every fibre of the metal must be equally strained in equal times. It is considered to be not only much stronger than the oval link chain, but lighter and more desirable in every way; besides which, it can neither kink nor foul. Regarding the comparative strength of such links, Mr. Turnbull makes the following remarks:—

When Mr. Thomas Telford proposed the erection of the Menai Suspension Bridge, he performed numerous experiments on the tensile strength of malleable iron, by which he ascertained that the mean force required to produce rupture in a bar of one square inch sectional area, was equivalent to a dead weight of 29½ tons, or 66,080 lbs. avoirdupois, exerted in the direction of the fibres; and this has been adopted conventionally by the most eminent engineers, as a standard for tensile strain ever since, assuming one-half of it, or 14¾ tons, as a measure of the force to which a bar of iron may be constantly subjected if drawn in the direction of its length.

Now, in the case of a cable link with straight sides, the direction of the strain may, for all practical purposes, be considered as nearly coincident with the fibres of the metal; and admitting this, the strain, or rather the force of resistance, will be directly proportional to the number of fibres in the transverse section.

Thus, if the sectional area be equal to two square inches, the constant straining force to which the metal may be exposed is 29½ tons, or 59 tons to produce fracture; the half of this being what was found to rupture a bar of one square inch of section: therefore, admitting the strain on a link of the cable to be similar to that on a straight bar where every fibre is equally strained, a link of ⅞ths of an inch in diameter will show a practical resisting of

$$\frac{7}{8} \times \frac{7}{8} \times \frac{7}{8} \times 0{\cdot}7854 = 8{\cdot}87 \text{ tons},$$

the weight which a bar of one-inch area of section will bear with safety, the metal being of a medium quality: this in round numbers may be taken at nine tons.

With regard to the link of an oval form with a stud in the middle, it cannot be so strong theoretically as the one without it; for it is manifest that the stud, besides increasing the weight of the chain very considerably, acts as a transverse lever on the fibres of the metal, which being compounded with the tensile strain, must in some measure operate to increase the effect; for a strain that is partly tensile and partly transverse must be more efficacious in producing rupture than one that is purely tensile.

The links at present in use are of two sorts: in one case they are short and curved without a stud, and in the other they are of an oval form, with a stud in the middle, with a view no doubt of preventing the link from collapsing. Cable makers give a proof weight of thirteen tons for a ⅞ link; but it would be advantageous to know what quality of iron they employ, and also by what rule they calculate the strength of the link with a stud; for we maintain that theoretically a body exposed to a compound strain cannot resist it so effectually as it can a simple.

ARCHITECTURAL COMPETITIONS.

IT would be but reasonable to require those who affirm that competitions are useful and desirable, to enunciate the grounds for such an opinion in a distinct form; but neither in public nor in private has it been my fortune to meet with any valid reasons in favour of the system, and scarcely with any attempt to state them. But by their practice many of the profession plainly declare that it is a good custom, though some think the manner of working it may be improved. I am of the number of those who hold that it is utterly inimical to the best interests both of the profession and the public; and with your permission I will briefly state the grounds of my opinion, in the hope that some gentleman will explain in what respect I, and others, err; and how it is that competitions do, or can be made to, aid in the advancement of architecture, and the advantage of the profession and the public.

First. The tribunal to whose judgment the designs are submitted, is quite unfit for performing the functions it has assumed. Building committees, for the most part, are composed of persons who know nothing of building operations: should it chance that there is one amongst them, who has had the least experience, he is a *quasi* pope, and launches his infallible dictum in the usual papal and arbitrary manner. The other members will probably consist of a cotton-broker, who is a first-rate judge of Sea Island, or East-India, but quite ignorant of the characteristic differences between the Grecian and Gothic styles: another may be a lawyer, well versed in precedent, with a great distaste for everything unsupported by the chapter and verse of example: the medical practitioner, anatomist though he be, urges sanitary improvements utterly irreconcilable with stability or convenience; whilst the manufacturer thinks that four walls of bright-red brick, with holes for windows—"just like my new mill"—is exactly the thing required.

When these gentlemen meet together, with some six or eight others equally qualified, and agree "after a division" to certain conditions, the advertisements are issued; and on the appointed day the designs are sent in. In the course of a few hours (where as many weeks would be too brief a season) a selection is made: the minority find their position strengthened by one or two of the designs submitted: some waverers, or absentees from previous meetings, are won over; and a selection is made greatly at variance with the conditions prescribed by this same committee! Perhaps it will be said that the reference to a professional umpire, and the public exhibition of the designs, will provide security against such frauds—to designate them from their *effects*, and not from the *intentions* of either committee or competitor: yet, in a case which came under my own knowledge, the designs were exhibited, and the committee did consult a surveyor, of high provincial repute, before making a selection; and their ultimate award was supported by his opinions. Having subsequent misgivings that the cost of execution would greatly exceed the proposed outlay, the working drawings and specification were submitted to the same surveyor, and were declared by him to be complete and satisfactory: the contracts were entered into, and the actual cost exceeded the proposed outlay fully 65 per cent., although a very important part of the stipulated accommodation was omitted. In this case, there is no doubt that part of the excess was occasioned by the intermeddling of individual committee men, and by the committee, as a body, sanctioning deviations from the contract drawings; but this would only account for a small portion of the excess, perhaps for 12 or 15 per cent.

I dissent from the analogy sometimes drawn between a competition in painting or sculpture, and one in architecture: in the former, the water-colour sketch, or the clay model, is almost a fac-simile in miniature of the completed work: even a cartoon is not more dissimilar than an engraving: but, to the uninitiated, architectural drawings do not convey any accurate notion even of the external appearance, much less of the minutiæ of internal arrangement, which ought to be a subject of great consideration in a building that is intended to be of any utility: even perspective drawings are very imperfectly understood on 'Change. Besides, it continually happens that committees, as well as individuals, materially alter their first ideas, upon more mature consideration, and after the inspection of different designs; and they see no dishonesty in making their selection under the guidance of their increased experience, instead of giving the premium, small though it be, to the architect who has adhered most closely to the instructions originally laid down by themselves; and then making an arrangement with him whose design is most in accordance with the experience they have gained.

In the preceding remarks I have supposed the committee to be influenced by a desire to act an honourable part, though they may manifest that wish in a strange way: but in how many cases are the selections notoriously made under the direction of private interest? Architects who engage habitually in the competition business, seem to have a code of morality and laws of honour peculiar to themselves: some tell me that where they have succeeded it has been through mistaken identity, or strong interest: one gentleman informed me that he never engaged in a competition without first securing some friendly interest in the committee; and others, whilst they assume that their own success is entirely the result of individual merit, freely allow that other cases have been decided through interested motives. It may be that committees are grievously wronged; that successful com-

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